the greater part of the time the decks were awash. Other vessels in the same area had a similar experience.

The month opened with the North Pacific anticyclone fairly well developed and occupying about its usual position. It remained nearly stationary until the 8th when there were indications of a movement eastward toward the continent. During this time a series of depressions from the western part of the ocean moved eastward across the Aleutian Islands and the Gulf of Alaska. During the passage of the disturbance of the 5th at Dutch Harbor the barometer at that place fell to 28.40 inches.

On the morning of the 10th the center of the anticyclone lay along the American coast, the central isobar being 30.50. Pressure was falling to the westward with the advance of a depression from the region of the Aleutians. By the 12th low pressure prevailed generally between the Hawaiian Islands and the mainland, being part of a system that extended thence westward to mid-ocean.

This distribution continued until the 16th when pressure rose over the region to the eastward of the Hawaiian Islands and a fresh anticyclone was formed. This was immediately reinforced from the northward by an area of high pressure that had appeared over Alaska on the 13th. The area broke up, however, on the 19th the northern portion moving southeastward over the western United States while the southern portion remained over the ocean. During the several succeeding days the latter was reinforced from the westward and attained to very large proportions. On the 25th–27th it covered the entire ocean east of the 170th meridian, W., and north of the 20th parallel. On the 25th and 26th the American S. S. *Manukai*, about midway between Puget Sound and Honolulu, recorded a barometer of 30.68 inches. A vigorous depression formed to the westward of this anticyclone on the 28th and moved northward to Bering Sea. On the morning of the 31st the barometer at Dutch Harbor was 28.58 inches.

Pressure was almost continuously below normal at Dutch Harbor, the average for the month being some 29.48 inches, about 0.23 below normal. The lowest pressure reported, 28.40 occurred on the 5th, the highest, 30.28, on the 25th. At Honolulu pressure was somewhat above normal on the 4th–9th and 20th–27th and below on other days. The average for the month was practically normal, being approximately 30.01 inches. The highest reading, 30.12, occurred on the 21st–22d and the lowest, 29.82, on the 31st. At Midway Island pressure was mostly above normal, the average being 30.03 inches, or about +0.03. The only negative departure of consequence, amounting for the period to −0.19, occurred on the 11th–15th. The highest was 30.20 inches on the 21st–22d.

PACIFIC TYPHOON BETWEEN GUAM AND YAP DECEMBER 3 TO 9, 1921.

By JOSÉ CORONAS, S. J., Chief Meteorological Division.

(Weather Bureau, Manila. P. I., Dec. 29, 1921.)

Our observations of Guam gave the first signs of this typhoon on December 3 when it was probably formed not far from 145° E. and 10° N. On the 4th telegraphic reports received from Guam and Yap showed the center about halfway between the two stations moving apparently to WNW. or NW. by W. On the 5th and 6th the typhoon was practically to the west of Guam and north of Yap with a tendency to incline northward. Finally it recurved northeastward on the 7th and 8th, the center passing between the Ladrone and Bonin Islands during the night of the 8th–9th.

The winds in Guam veered from NE. to SE., S. and SW., while in Yap they backed first from NW. to W. and SW., and then they veered to WSW., and possibly to W., although the observations received so far are not complete.

The American steamer *Granite State* was well under the influence of this typhoon on December 6 to 8, on her way from Honolulu to Manila. The steamer was on these days between 145° and 135° E., 16° and 18° N.; the barometric minimum 746.75 mm. (29.40 inches) was observed between 2 and 3 a. m. of December 8, and a gale reported from SE., S. and SW. on the 7th and 8th.

Meteorological observations for Dec. 2 to 8, 1921.

	Guam.				Yap.			
Date and hour.	Pressure.[1]	Wind. Direction.	Wind. Force 0–12.	Weather.	Pressure.[1]	Wind. Direction.	Wind. Force 0–12.	Weather.
Dec. 2:	*mm.*				*mm.*			
6 a. m.	758.8	ne.	1	c.	.....	.....	.....	.....
2 p. m.	57.3	ne.	2	o.	.....	.....	.....	.....
Dec. 3:								
6 a. m.	57.0	ne.	4	r.	.....	.....	.....	.....
2 p. m.	54.3	ene.	5	o. q.	.....	.....	.....	.....
Dec. 4:								
6 a. m.	55.1	ese.	4	o. q.	755.2	nw.	3	c.
2 p. m.	54.7	ese.	4	p.	.....	.....	.....	.....
Dec. 5:								
6 a. m.	56.8	s.	1	p.	55.0	wsw.	3	c.
2 p. m.	55.2	se.	4	o. q.	55.4	w.	3	c.
Dec. 6:								
6 a. m.	56.0	sse.	3	r.	53.3	wsw.	5	c.
2 p. m.	55.4	sse.	3	p.	53.9	wsw.	5	o.
Dec. 7:								
6 a. m.	56.2	sse.	3	p.	54.7	sw.	3	b.
2 p. m.	55.5	se.	3	p.	54.4	wsw.	3	b.
Dec. 8:								
6 a. m.	56.6	s.	2	p.	56.1	sw.	2	c.
2 p. m.	56.2	ssw.	4	c.	55.7	wsw.	3	c.

[1] Gravity correction not applied.

ADDITIONAL NOTE ON THE WEST INDIAN HURRICANE OF SEPTEMBER 5-17, 1921.

The Weather Bureau recently received from the master of the Danish S. S. *Florida* a report of the weather experienced by that vessel on September 5-7, 1921, during a voyage from Philadelphia to Rio de Janeiro, which showed that the hurricane which passed over the Windward Islands on the night of September 8 was in existence as early as the 5th. The following extract has been taken from the report.

Position at noon of September 5, 13° 15′ N., 47° 36′ W., barometer 30.37.[1] wind SE., 2; sea SE., 2; 4 p. m., barometer 30.29, wind ENE., 2, sea ENE., 2; 8 p. m., barometer 30.28, wind ENE., 3, sea ENE., 3. At sunset the sky was very red and over the northeast horizon all was dark. The clouds observed comprised A. St., Fr. Nb., and Cu. Nb.; at this time the weather started to get squally.

At midnight of the 5th–6th the barometer was 30.29, wind NE., 4, sea NE., 4. At 4 a. m., barometer 30.17, wind ENE., 6, sea ENE., 6. At this time the same clouds were observed as at sunset on the preceding day but it was darkest over the northern horizon; 8 a. m., barometer 30.14, wind ENE., 6, sea ENE., 6. Noon, barometer 30.11, wind ENE., 8, sea ENE., 6. Position, 10° 10′ N., 45° 48′ W.

At 1 p. m. (6th) the wind suddenly turned to S., force 9; 4 p. m., barometer 30.11, wind S., 9, sea SE., 7, clouds, A. St. and Fr. Nb.; 8 p. m., barometer 30.23, wind SSW., 8, sea S., 7. Midnight, barometer 30.27, wind S., 6, sea S., 6, clouds Cu. Nb.; 4 a. m. (7th), barometer 30.23, wind S., 4, sea S., 4.

Had the *Florida* been equipped with wireless apparatus and able to send out reports of the hurricane the information would have been of great value, especially to the people of the Windward Islands, who had but very short notice of its approach.—*F. G. T.*

[1] The barometer evidently reads too high but no correction is available.

NOTES ON WEATHER IN OTHER PARTS OF THE WORLD.

Canada.—Montreal, January 12.—Several thousand unemployed found work to-day clearing [snow from streets as a result of the] blizzard last night. Drifts were 8 feet deep in places.—*New York Herald, January 12, 1922.*

Newfoundland.—St. Johns, January 25.—A blizzard which has raged in Newfoundland for the last 24 hours, piling up huge drifts, and the intense cold have resulted in the closing of many harbors. * * * The steamer *Stella Maris*, caught in the ice in Bonne Bay, was held so fast that it was believed there was little chance of her being able to get out before spring.—*New York Herald, January 26, 1922.*

Portugal.—Lisbon, January 21.—More than 50 deaths and incalculable damage to shipping, in addition to the unroofing of houses and uprooting of trees, resulted from the storm which swept Portugal early in the week. Reports from the northern Provinces have only just been received, as they were delayed through the breaking of communications. Many ships were driven aground by the gale.—*Chicago Post, January 21, 1922.*

Italy.—The exceptional drought and its serious consequences are still the topic of the day in northern Italy, says the London *Times*. In the Trentino the water of a lake has fallen so much that a small island never seen before within living memory has appeared in the middle. From an inscription on a stone on this island, the people learn that a great drought occurred in 1806 and that in that year, too, the small island emerged from the water. Father Gaddoni, of Imola, says that one must go back to the year 1621 to find another drought in the Po Valley similar to the present one.—*New York Evening Mail, January 20, 1922.*

Russia.—Riga, January 25.—Navigation has been suspended in the Gulf of Riga on account of ice, and shipping has become exceedingly difficult in the port of Reval.—*New York Herald, January 26, 1922.*

China.—The Yellow River, which created such havoc last August, has once more deserted its bed, carrying destruction to 13 Provinces. So sudden was the rise that the inhabitants were not able to get out of the way; whole villages were washed down the river and thousands of people were drowned. Great tracts were flooded in Shantung, Kiansu, and Ahnwei. The submerged area was estimated at about 10,000 square miles.—*The Pathfinder, January 14, 1922.*

Hawaii.—An iceberg, said to have been exposed 200 feet in length and rising 10 feet out of the water, was seen by passengers of the steamship *Shinyo Maru*, 25 hours out of Honolulu, on January 10 * * *.

This is believed to be the first time an iceberg has been seen off the Hawaiian Islands.—*Evening Star, Washington, D. C., January 16, 1922.*

Panama.—Panama, January 4.—Torrential rains have flooded the River Tuira, in the Province of Darien, and the villages of Pinogana and Yavisa are inundated.—*Washington Post, January 5, 1922.*

DETAILS OF THE WEATHER IN THE UNITED STATES.

GENERAL CONDITIONS.

The features which give individuality to the month were the persistence of anticyclones over the Great Basin region which seemed to be a point of concentration and of subsequent dispersion of anticyclones; uniformly high mean pressure in all parts of the country; irregular distribution of mean temperature and precipitation and at least three severe cyclonic storms, one of which No. IV of Chart III was the direct cause of much property loss along the middle Atlantic coast and No. XII which gave the remarkably heavy snow in the States of North Carolina, Virginia, Maryland, Delaware, the District of Columbia, and southeastern Pennsylvania.

The usual details follow.

Lows.	Alberta.	North Pacific.	South Pacific.	Northern Rocky Mountain.	Colorado.	Texas	East Gulf.	South Atlantic.	Central.	Total.
January, 1922....	8.0	1.0	2.0	.....	3.0	1.0	1.0	1.0	.....	17.0
Average number, 1892–1912, inclusive.....	4.7	2.5	0.9	0.4	1.4	1.5	0.4	0.4	0.5	12.7

Highs.	North Pacific.	South Pacific.	Alberta.	Plateau and Rocky Mountain region.	Hudson Bay.	Total.
January, 1922.....	3.0	1.0	5.0	.....	.....	9.0
Average number, 1892–1912, inclusive	0.8	0.6	5.5	1.7	0.4	9.0

CYCLONES AND ANTICYCLONES.

By W. P. DAY, Observer.

There was much similarity between the number and the predominating types of both HIGHS and LOWS in January as compared with December. The Plateau HIGH was persistent during much of the month. The unusual path of the Alberta HIGH of the 22d–31st which turned back on itself over Ontario was due to a reinforcement of pressure from the Hudson Bay region just as the Alberta HIGH was about to disintegrate. The two most severe storms of the month occurred off the middle Atlantic coast on the 11th and the 28th. The latter storm was halted off the Virginia Capes and turned at right angles to its previous path by the reinforcement of the previously mentioned HIGH (22d–31st).

FREE-AIR CONDITIONS.

By W. R. GREGG, Meteorologist.

Beginning with January, 1922, and monthly thereafter, there will appear in each number of the REVIEW a brief summary of the free-air conditions during that month, as observed by means of kites, balloons, airplanes, etc. The main purpose will be to discuss these conditions in relation to those at the surface and in relation to *normal* values at different levels—in effect, to present a review or survey of free-air conditions while they are still of current interest.

Table 1 gives for January the average values of temperature, relative humidity, and vapor pressure, together with departures from normal, and Table 2, resultant winds and normals, as determined from observations